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PSYCHE

Vol. 63 June, 1956 No. 2

A NEW SPECIES OF *MYRMOTERAS* FROM CEYLON (HYMENOPTERA: FORMICIDAE)[1]

By Robert E. Gregg

Department of Biology, University of Colorado

Several specimens of a new ant belonging to the genus *Myrmoteras* were collected recently on the Island of Ceylon by Dr. Edward O. Wilson, and were sent to me for study and description.

Myrmoteras ceylonica sp. nov.

Fig. 1

Worker: Length, 3.09 mm.; head length (excluding mandibles), 0.90 mm.; head index, 0.94; thorax length, 1.17 mm.

The head of this species is heavily granulate, except for the shining occiput, occipital flange, and gula, and recalls the condition of *M. williamsi,* but unlike the latter species in which the cephalic furrow is marked, *ceylonica* shows no more than an elusive trace of this furrow. In certain lights, a narrow, median line of reduced and more widely spaced granules permits the area to shine and thus give a faint resemblance to the groove of other species such as *binghami, donisthorpei, williamsi,* or *karnyi. M. ceylonica,* therefore, belongs in that subdivision of the genus in which the head does not possess a median longitudinal furrow, or in which such a furrow is short and indistinct or nearly obsolete. Previously, only three species were found in this group, namely, *mjoebergi, kemneri,* and *barbouri.*

The new species may be distinguished at once from *mjoebergi* (3-5.6 mm.) by its smaller size (3.09 mm.) and

[1] Published with a grant from the Museum of Comparative Zoology at Harvard College.

by the heavy granulate sculpture of the head, for in the latter species the head, according to previous authors, is very smooth and shining. From *barbouri* (6.9 mm.), it may be separated by its much smaller size, by the possession of two distinct denticles between the last and the penultimate mandibular teeth, and by the presence of more or less longitudinal rather than transverse rugae on the mesonotum.

In the published keys to the species of *Myrmoteras* (Creighton, 1930; Wheeler, 1933; Gregg, 1954), the Ceylon specimens run easily to *M. kemneri.* Despite their apparent close relationship to this species, consideration of the structural details and size of *kemneri* (6 mm.), and the wide distributional gap between the two, make it quite evident they represent different species. Although the

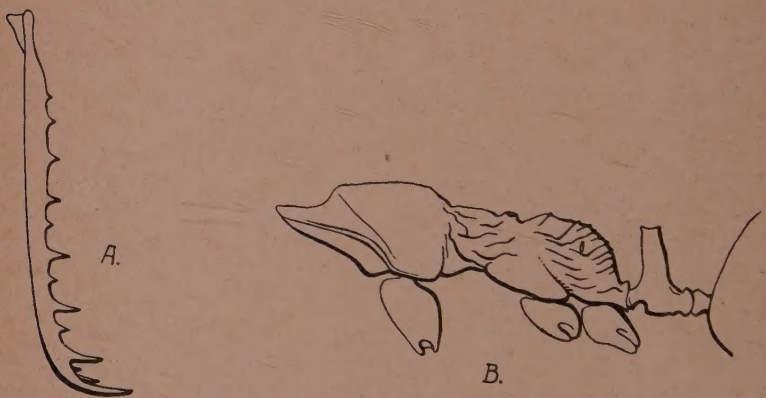

Fig. 1. *Myrmoteras ceylonica* sp. nov. A. Right mandible. B. Profile of thorax and petiole.

author has not seen a specimen of *kemneri,* a study of the description and the figures given by Wheeler enable me to provide the following comparisons. The antennal scape in *ceylonica* surpasses the occipital corner by a distance equal to a little less than one-half its total length, while in *kemneri* the scape surpasses the corner by an amount equal to a little more than one-half its total length. Mandibular teeth in *ceylonica* number 11, not counting the minute ante-apical denticles, whereas there are 10 in

kemneri. Further, the 5th, 7th, and 9th teeth in *ceylonica* are distinctly smaller than the ones with which they alternate, while in *kemneri* only the 8th appears to be smaller (Fig. 1). In profile, the dorsal surface of the pronotum is flat in the center and passes through distinct angles to slope both anteriorly and posteriorly, whereas in *kemneri* the pronotum shows an even and relatively low convexity from front to back. The mesothorax of *ceylonica* is short in side view, being almost quadrate, and with a flat dorsal contour that depresses slightly to the meso-epinotal suture. The same structure in *kemneri* is decidedly elongate and shallowly saddle-shaped with prominent mesonotal spiracles. The epinotum of *ceylonica* is about as high as it is long with an even curvature dorsally, while that of *kemneri* is very much longer than high and its dorsal contour arches upward to the rear. Probably the most distinctive feature separating these two ants is the petiole. In *ceylonica* the anterior and posterior peduncles are quite short, the scale is narrow antero-posteriorly, and high, with flat, nearly vertical front and rear surfaces; the crest is truncated and margined anteriorly and posteriorly with minute but definite ridges, which give the summit of the node an appearance of being depressed or concave. By contrast, in *kemneri,* the posterior peduncle is longer than the anterior, the anterior and posterior surfaces of the node are rounded and sloping, and the crest is evenly rounded in all directions.

Sculptural features of the head in the two species seem to be remarkably similar, as they are heavily granulate and give the surface a coriaceous and opaque appearance. The same condition is true of the pronota also, though this structure is a little more shining at least in *ceylonica* owing probably to the large size of the granules. The mesonotum and epinotum of *ceylonica,* unlike the smooth, opaque, almost sculpturless corresponding structures of *kemneri,* are furnished with pronounced rugae that are more or less longitudinal on the mesonotum, but very heavy and distinctly transverse on the dorsum of the epinotum. Rugae of the mesopleurae and epinotal pleurae are longitudinal but finer in texture. The interrugal

granules of all these areas are sparse, causing a general shininess of the regions despite their heavy sculpture. The surfaces of the petiole and the gaster are very shining and thus different from the dull aspect of these parts in *kemneri.*

In color, *ceylonica* does not appear to differ significantly from *kemneri.* The head and thorax are rich reddish brown, the petiole and gaster a bit lighter brown, and the mandibles, antennae, and legs yellowish to yellowish brown. Hairs pale yellow.

Holotype: worker (in the collection of the Museum of Comparative Zoology).

Paratypes: two workers (one in the M.C.Z. and one in the author's collection).

Type locality: Udawaddatekele Sanctuary, Kandy, Ceylon; elevation 2000 feet; collected by E. O. Wilson, July 13, 1955, No. 1245.

Dr. Wilson has been able to supply a few natural history notes concerning *Myrmoteras ceylonica.* The workers were observed in second growth tropical evergreen forest, and were found to be foraging during daylight hours on the ground and over low herbaceous vegetation. They were said to be in the company of individuals of *Tetramorium* and *Trigonogaster,* and moved with about the pace of a *Tetramorium caespitum.* When they were disturbed, their mandibles were thrown open and seemingly "locked" at approximately 200°.

In a previous paper (1954), I discussed the known limits of distribution of the genus *Myrmoteras,* and included a tentative map showing the supposed range of these ants. The present specimens and the new species which they represent, extend the distribution beyond the boundaries of the Indo-Malayan region to the Island of Ceylon. Such a pattern suggests that the genus may be represented in India, but until actual records showing this have been obtained, it is impossible to make such a claim. The northern-most localities for these ants at present are Tenasserim, Burma, and the Island of Hainan off the southeast coast of China.

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Wheeler, W. M.

1933. A new *Myrmoteras* from Java. Proc. New England Zool. Club, 13:73-75, 1 fig.

A Synonym in the Genus Chrysopa (Neuroptera: Chrysopidae)—Banks described *Chrysopa sperryi* (Psyche *50*:74-75) as differing from all other species of the *plorabunda* section in lacking genal markings. An examination of the type (from Riverside, Calif., Sept. 7, 1940, ♀, Sperry: here designated lectotype), paratypes, and additional material from Riverside disclosed every gradation from no genal marks to well-defined red ones. The type and all but one of the paratypes are faded or pale individuals of *Chrysopa comanche* Banks 1938 (Can. Ent. *70*:119-120); *sperryi* is therefore a synonym of this species. One of the paratypes, collected at the same time as the others, is a faded male *C. plorabunda californica* Coq., which lacks the red on the cheeks, but has the black mark plainly visible. A long series of *comanche* from Sabino Canyon, Baboquivari Mts., Arizona, Sept., 1951 (L. M. Martin, Los Angeles County Museum) also shows every gradation between well-defined cheek markings and none at all; the holotype of *comanche*, from Laredo, Texas, has only the faintest trace of the red marks. These identifications were made with the aid of male genitalic characters. — Phillip A. Adams, Harvard University.

TWO NEW SPECIES OF CERATOPOGONIDAE (DIPTERA)[1]

By Franklin B. Lewis

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During an investigation of the bionomics and immature stages of the Ceratopogonidae, two new species were encountered. The purpose of this paper is to describe these insects.

Helea (Isohelea) serrata n. sp.
Fig. 1

Description: Antennae dark brown, pedicel black; vertex black; eyes barely touching. Tergum of thorax shiny black with faint bluish brown pruinescence; pleurae shining black; scutellum black. Femora brownish, all tibia with yellow-white apices; tarsi whitish, claws unequal with small basal barbs. Wings milky-white; M2 broadly interrupted; costal vein light brown; radial cells with slight brownish infuscation; cell R1 longer than cell R2, cell R2 teardrop-shaped. Halteres with bases brownish, knobs white. Abdomen black-brown above with faint bluish pruinescence. Female resembles male in most respects, but has lighter legs. Tibial comb with six equally long spines, each about as long as tibial width at distal tip; five small spines between each two adjacant long spines; these small spines one half the length of the long spines. Male genitalia (Fig. 1) large, basistyles about as broad as long, dististyles very short and slender. Parameres separated at base, fused distally and finally separated at very tip, these tips recurved. Aedeagus

[1] A portion of a thesis submitted in partial fulfillment of the requirements for the Doctor of Philosophy degree at the University of Connecticut in 1955.

broad, spatulate with sclerotized teeth on lateral margins of tip (Fig. 1, B). Dorsal inner processes small but longer than ventral inner processes. Ninth sternite small with a shallow excavation in middle. Apicolateral processes small and blunt.

Length: 1.4 mm.; wing 1.0 mm. x 0.5 mm.; female slightly larger.

Type Data: Holotype; male, Storrs, Conn., May 18, 1953 (F. B. Lewis); USNM type No. 62699, deposited in U.S. National Museum. Paratypes; male, Storrs, Conn., June 15, 1953 (F. B. Lewis); two females, Storrs, Conn., June 14, 1954 (F. B. Lewis); deposited in USNM, University of Connecticut, and author's collections.

Comparative Notes: A small blackish species having a shiny black thorax and a dull black abdomen with brownish blue pruinescence. The wings are whitish. This species keys out to *pruinosa* in Wirth's (1952)[2] key to the California species. *Serrata* resembles *pruinosa* Wirth closely but differs in the bluish cast, larger size, and unequal claws. The most outstanding difference is between the aedeagi of the two species. The toothed edges of *serrata's* aedeagus is the best distinguishing character as it separated the species from all others in the genus known to the author. The bluish cast will separate either sex from all known New England species.

Johannsenomyia smithi n. sp.

Fig. 2

Description:

Head black, eyes separated; vertex shining black; antennae brownish, pedicel shining black; flagellar hairs brownish-black. Dorsum of thorax shiny black with a thin covering of short light brown hairs, pleurae shining black. Fore and mid femora light brown with black apices, hind femora light brown on basal fourth, distal three-quarters dark brown. Hind tibia all dark; hind tarsi light with dark apices. Claws equal and unbarbed. Wings hyaline,

[2] Wirth, W. 1952. The Heleidae of California. Univ. Cal. Pub. Ent., 9(2):95-266.

M2 sessile; two distinct radial cells. Abdomen dark brown. Tibial comb with five long equal spines shorter than tibial width at distal tip. Small spines one quarter the length of the long spines. Male genitalia (Fig. 2) with ninth sternite deeply excavated; basistyles long and slender with sharp medially pointing inner processes very large; dististyles small, slender, and sharp-pointed. Ninth tergite blunt and truncated with large lobe-like apicolateral processes each with a small lateral lobe at the base. Parameres fused to distal third, tips separate and knobbed. Aedeagus broad, sclerotized along lateral margins, tip with laterally produced lobes forming a cresent-shaped tip.

Length: 1.7 mm.; wing 1.5 mm. x 1.0 mm. Female unknown.

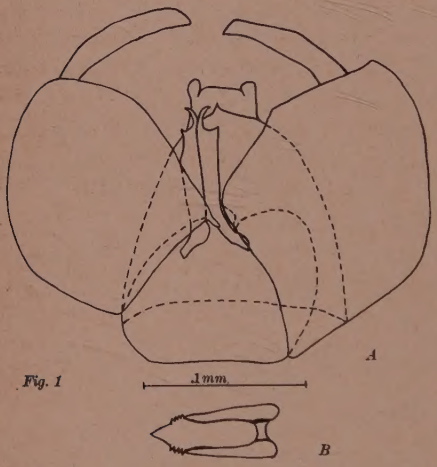

Fig. 1

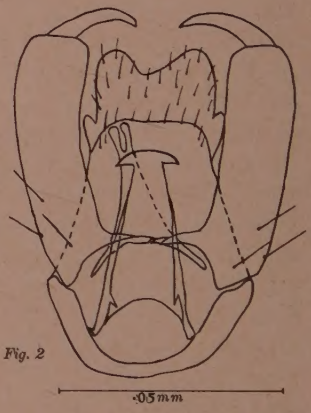

Fig. 2

Fig. 1. A. Ventral view of male genitalia of *Helea* (*Isohelea*) *serrata* n. sp. B. Aedeagus. Fig. 2. Ventral view of male genitalia of *Johannsenomyia smithi* n. sp.

Type Data: Holotype; male, reared from pupa, Oxford, Conn., June 4, 1954 (F. B. Lewis), USNM type No. 62698, deposited in U.S. National Museum, Paratypes; two males, same data as holotype, in University of Connecticut and author's collections.

Comparative Notes: A blackish species with shiny black thorax and legs brownish with black knees. The specimens were taken from a small brook-fed bay on a large lake. The water was still and algae-choked. This species resembles *Johannsenomyia syblae* Wirth from California, but differs in the details of the male genitalia. The genitalia easily separate this species from any known New England species. This species is named for Dr. Howard W. Smith in appreciation of his continued advice and help during the author's study.

THE IDENTITY OF LORDOMYRMA RUGOSA CLARK. — Through the courtesy of Curator Elisabetha Bajári of the Hungarian National Museum, I have been able to examine the type of *Dacryon christae* Forel (1907, Ann. Mus. Nat Hungar., 5: 16, worker: type loc., Botany Bay, Sydney, New South Wales) and to compare it with nidotypes and topotypes of *Lordomyra rugosa* Clark (1934, Mem. Nat Mus. Victoria, Melbourne 8: 38, pl. III, figs. 3, 4, worker, female: type loc., Ferntree Gully, Victoria) and with a worker and female from Como, New South Wales (J. Freeland). All of these samples appear to represent a single species. The type is a rather small example, with a relatively slightly narrower head (head L, including clypeus, 0.92 mm., head width without eyes 0.82 mm.), but in other ways agrees perfectly with the *rugosa* types. *Lordomyrma rugosa* must therefore be considered as a NEW SYNONYM of *Dacryon christae*. This species varies appreciably in depth of color, length of propodeal and petiolar teeth, and coarseness of sculpture. At Ferntree Gully, Victoria, where I collected the species, it nested in small colonies (40-50 workers, one queen) under stones in grassy-floored sclerophyll forest of the intermediate moisture type. The adults feign death when disturbed. — W. L. BROWN, JR., Museum of Comparative Zoology, Harvard University.

THE FIRST SPECIES OF PAMPHANTINAE FROM PUERTO RICO (HEMIPTERA: LYGAEIDAE)

By James A. Slater

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The subfamily Pamphantinae was erected by Barber & Bruner (1933) with *Pamphantus* Stal as type genus. Prior to that time only three species were known, all from Cuba. Barber & Bruner described a new genus, *Neopamphantus,* also from Cuba, and recorded a new species, *Pamphantus atrohumeralis,* from Haiti. Barber has recently (1954a) described a remarkable new Cuban genus, *Abpamphantus* and in the same year (1954b) a second new genus, *Parapamphantus,* from Brazil, this latter representing the first occurrence of the subfamily outside of the West Indies.

The new species described in the present paper is the first species known from Puerto Rico and adds an additional island to the distribution of this essentially Caribbean group.

Pamphantus pellucidus, new species

Macropterous male: Surface shining; coloration pale testaceous throughout, lacking dark dorsal markings; terminal one-half of fourth antennal segment dull brown; eyes and ocelli bright red; body very sparsely clothed with scattered upright hairs.

Head non-declivent, vertex with a narrow, sharp median longitudinal carina, first antennal segment extending beyond apex of clypeus for one-half its length, head strongly contracted behind eyes, length head .60 mm., width across eyes .70 mm., interocular space .40 mm.; pronotum elon-

gate, nearly as long as wide and only slightly narrowing anteriorly, lateral margins sinuate and narrowly carinate anteriorly, surface punctate except in area of calli, lacking a well defined transverse constriction, length pronotum .75 mm., basal width .80 mm.; scutellum punctate, lacking a median carina, length .30 mm.; hemelytra strongly expanded on posterior two-thirds along corial margin, claval commissure well developed, length .45 mm.; apical margin of corium straight, distance apex clavus-apex corium .85 mm., distance apex corium-apex abdomen .75 mm., membrane not quite attaining apex of abdomen; labium attaining mesocoxae, basal segment extending posteriorly halfway to base of head, second segment exceeding base of head by one-half its length, length labial segments I, .28 mm., II, .38 mm., III, .30 mm., IV, .32 mm.; femora not incrassate, devoid of spines or teeth; antennae elongate, first segment rather stout, fourth fusiform, length antennal segments I, .25 mm., II, .72 mm., III, .62 mm., IV, .85 mm. Total length 3.75 mm.

Brachypterous male: Smaller (total length 3.15 mm.), head somewhat more declivent, posterior pronotal lobe markedly reduced; hemelytra reduced to a pair of heavily punctured truncate pads with a very narrow terminal rim of membrane, clavus and corium indistinguishably fused, hemelytra extending caudad onto third abdominal tergite, posterior margin of tergites four and five curving caudad mesally (as in *Geocoris*), anterior abdominal sterna incompletely fused, connexivum prominent and upcurved; labium reaching metacoxae.

Holotype: Macropterous male. PUERTO RICO: El Yunque, 3,000 ft., May 1938, Darlington. In Museum of Comparative Zoology (Harvard). Paratype: Brachypterous male. PUERTO RICO: Ensenada, June 14-19, 1915. In American Museum of Natural History.

This species is related to *Pamphantus pallidus* Barber & Bruner from Cuba. It differs primarily in not possessing spined and incrassate fore femora, in the complete lack of fuscous color markings on the dorsum and in the greater relative length of the fourth antennal segment. In *pel-*

lucidus the length of the fourth antennal segment is slightly greater than the width of the pronotum (85:80) whereas in *pallidus* the antennal length is considerably less (60:80).

This is the only known occurrence of marked brachyptery in the genus *Pamphantus*, although both *Abpamphantus* and *Parapamphantus* were described from brachypterous specimens. In fact the non-spinous fore femora (unique in the genus) and the presence of a median vertex carina are suggestive of *Parapamphantus*. However, in most respects the species is related to *Pamphantus*. There seems to be little value in establishing an additional genus for the species at the present time when a moderate expansion of the present generic concept of *Pamphantus* will probably more accurately reflect the systematic picture.

The posteriorly curving fourth and fifth abdominal tergites support the geocorine relationship of the pamphantines as noted by Barber & Bruner.

The brachypterous paratype has the right antenna missing and the left is oligomerous with three segments present.

Check List of the Pamphantinae

ABPAMPHANTUS Barber 1954.

1. *gibbosus* Barber 1954 (*Abpamphantus*) Cuba

NEOPAMPHANTUS Barber & Bruner 1933.

1. *calvinoi* Barber & Bruner 1933 (*Neopamphantus*) Cuba
2. *maculatus* Barber & Bruner 1933 (*Neopamphantus*) Cuba

PAMPHANTUS Stal 1874.

1. *atrohumeralis* Barber & Bruner 1933 (*Pamphantus*) Hispaniola
2. *elegantulus* Stal 1874 (*Pamphantus*) Cuba
3. *mimeticus* Barber 1926 (*Pamphantus*) Cuba
4. *pallidus* Barber & Bruner 1933 (*Pamphantus*) Cuba
5. *pellucidus* new species Puerto Rico

?6. *stenoides* Guerin 1857 (*Lygaeus; Pterotmetus*) Cuba

7. *vittatus* Bruner 1932 (*Pamphantus*) Cuba

PARAPAMPHANTUS Barber 1954.

1. *braziliensis* Barber 1954 (*Parapamphantus*)
Brazil

Acknowledgements

My sincere thanks are extended to Drs. Mont Cazier and Herbert Ruckes of the American Museum of Natural History and Drs. P. J. Darlington and W. L. Brown of the Museum of Comparative Zoology for allowing me the privilege of examining material from their respective institutions.

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1933. A new subfamily of Lygaeidae, including a new genus and two new species of *Pamphantus* Stal .(Hemiptera-Heteroptera: Lygaeidae). Jour. N.Y. Ent. Soc. 41: 531-542.

STUDIES ON THE NORTH AMERICAN REPRESENTATIVES OF *EPHEBOMYRMEX* (HYMENOPTERA: FORMICIDAE)

By W. S. Creighton

Department of Biology, City College, New York.

Pogonomyrmex (*Ephebomyrmex*) *imberbiculus* was described by W. M. Wheeler in 1902 and seven years later he added the descriptions of *pima* and *townsendi*. Since that time there has been surprisingly little additional information published on these interesting ants. What has appeared has consisted largely of locality records, but few of these have added much to our knowledge of the ranges of these insects. It is gratifying to be able to present a more complete picture of the distribution of our representatives of *Ephebomyrmex*, particularly since this clears up certain questions related to the taxonomic status of *townsendi*. It has also been possible to expand Wheeler's account of the habits of *imberbiculus*, for it appears that these same habits are true of *pima* also. In past years the writer has been able to study 53 colonies of *Ephebomyrmex* at 40 stations. This study has shown that the ranges of both *imberbiculus* and *pima* are much more extensive than was formerly supposed. It has also shown that *townsendi* is a synonym of *imberbiculus*.

Wheeler described *townsendi* in 1909 (1) on the basis of a single specimen from Chihuahua. It is hard to avoid the suspicion that one of Wheeler's reasons for giving *townsendi* specific status is the fact that the type specimen came from Mexico. Certainly the structural features which distinguish *townsendi* from *imberbiculus* are not particularly impressive. They consist mainly of the sculpture of the postpetiole and the first gastric segment. Wheeler believed that in *imberbiculus* the postpetiole is

so feebly rugose as to be almost smooth and is marked only by scattered patches of punctures. In this same species the dorsum of the first gastric segment was said to be smooth and shining and without basal punctures. In *townsendi,* on the other hand, both the postpetiole and the dorsum of the first gastric segment were described as completely covered with fine, dense punctures and opaque. Wheeler also claimed that in general *townsendi* is more opaque than *imberbiculus.* Olsen accepted *townsendi* as a separate species in 1934 (2) but the writer in 1950 (3) treated it as a subspecies of *imberbiculus.* At that time there was little material of *townsendi* available but, since it was still the only member of the subgenus known from Mexico, it could be regarded as a southern race of *imberbiculus.* It is now clear that such a treatment is erroneous. As material began to accumulate it became apparent that *imberbiculus* occurs much further south in Mexico than does *townsendi* and that the latter form occurs at random, principally in the northwestern portion of the range of *imberbiculus.* The writer has taken colonies which agree well with the type of *townsendi* in northern Sonora and at three stations in southern Arizona. In these specimens both the postpetiole and the basal two-thirds of the dorsum of the first gastric segment are densely and evenly covered with small, close-set punctures which render the surface opaque or nearly so. These specimens can, without any difficulty, be assigned to *townsendi,* but this is not true of others which are intermediate in character. One nest from northwestern Chihuahua has the gastric punctuation limited to the anterior third of the segment. Another large colony from southeastern Arizona shows some individuals without gastric sculpture and others with only a small area of sculpture immediately adjacent to the postpetiole. In both these colonies the sculpture of the postpetiole is like that of *townsendi.* After it was appreciated that the supposedly definitive features of *townsendi* vary, a reexamination was made of all specimens previously assigned to *imberbiculus.* This established the

surprising fact that in most of the longer nest series there were a few workers which had a dull, densely punctate postpetiole like that of *townsendi*. In short, there is no constancy in the sculptural characteristics which were used as the basis for the recognition of *townsendi*. The case offers a close parallel to that of Olsen's *salinus*, a species which was also based on a single specimen which had a densely sculptured gaster. M. R. Smith has recently shown (4) that *salinus* is a synonym of *occidentalis*, being nothing more that an inconsequential variant which occurs in certain nests at the western end of the range of that wide-spread species. It appears that we must take the same stand with *townsendi*. Since *townsendi* is nothing more than a minor variation which occurs at random over a part of the range of *imberbiculus*, it is best treated as a synonym of *imberbiculus*.

Presented below is a list of the stations at which *imberbiculus* and *pima* have been taken. The previous records for *townsendi* are included with those for *imberbiculus*. Where possible elevational data for the older records have been supplied from topographic sheets. The writer is aware of the difficulties inherent in this method, but the stations so treated were in areas which left little doubt as to the elevation involved. The records for which no collector's name is given are those of the writer. Elevational data for these stations were secured from altimeter readings at the station, which were checked then or later against topographic sheets.

Pogonomyrmex (*Ephebomyrmex*) *imberbiculus* Wheeler:

CALIFORNIA: Yaqui Well, Anza Desert State Park (1400′).

ARIZONA: Kofa Mountains, Palm Canyon (1600′); Ajo Mountains, Alamo Canyon (2300′); Santa Rita Mountains, mouth of Madera Canyon (4800′); Tucson (2400′) W. M. Wheeler; Pinaleno Mountains, Fort Grant (4800′) Cornell Univ. Exped.; Whetstone Mountains, Dry Canyon (5000′); Huachuca Mountains, Garden Canyon (5800′); Safford (3000′).

SONORA: Divisadora de Leon, 23 miles north of Hermosillo (1200′).

NEW MEXICO: Aden (4300′) W. M. Wheeler; Animas Mountains, San Luis Pass (5400′); Lordsburg (4200′); Alamogordo (4300′) G. von Krockow. The ten records which follow are those of A. C. Cole: Dillia (5200′); 25 miles east of Bernardo (5950′); 18 miles southeast of Bayard (6000′) Malpais Lava Beds, near Carrizozo (5400′); 8 miles west of Alamogordo (5800′); 6 miles northwest of Deming (4550′); 20 miles north of Bernardo (6550′); 7 miles west of Socorro (7000′); 12 miles west of Hope (5200′); 23 miles north of Las Cruces (4500′).

CHIHUAHUA: Sierra de en Medio, Nogales Ranch (5000′); 6 miles south of Gallego (5100′); 7 miles north of Chihuahua City (4700′); 15 miles west of General Trias (5600′); Ojo del Cerro Chilicote, C. H. Townsend.

DURANGO: 17 miles south of Rodeo (5500′); 5 miles west of Durango (6300′).

COAHUILA: Sierra de la Muralla, 46 miles south of Monclova (4000′); 24 miles east of Ramos Arizpe (4600′).

TEXAS: 10 miles west of Sierra Blanca (4500′); Chinati Mountains, Arsarca Canyon (4800′); Chisos Mountains, Burnhams Ranch (4000′); Davis Mountains State Park (5000′); Ft. Davis (4700′) W. M. Wheeler; Alpine (4500′); San Angelo (1850′) W. M. Wheeler; Pyote 2600′); Langtry (1300′) W. M. Wheeler; Del Rio (950′) W. M. Wheeler; Juno, Cornell Univ. Exped.; Austin, Mt. Barker (640′) TYPE LOCALITY W. M. Wheeler.

OKLAHOMA: Wichita National Forest, W. Fisher; Harmon County, W. Fisher.

Pogonomyrmex (*Ephebomyrmex*) *pima* Wheeler:

ARIZONA: 5 miles south of Wickenberg (1800′); Tempe (1100′) W. M. Wheeler; Phoenix (1100′) W. M. Wheeler; Florence (1500′) W. M. Wheeler; Casa Grande (1500′)

W. M. Wheeler; 8 miles north of Casa Grande (1500′); 5 miles east of Aguila (2200′); 20 miles east of Gila Bend (2700′); Organpipe Cactus National Monument, Headquarters (1600′), Dripping Spring (1700′), Abra Wash (1300′), Quitobaquito (900′); Tucson (2400′) TYPE LOCALITY W. M. Wheeler; Bowie (3750′) W. M. Wheeler; Continental (2900′) no collector.

SONORA: 10 miles south of Sonoyta (1400′); 5 miles south of Santa Ana (2500′); Puerto Gonzalitos (2500′); 10 miles south of Hermosillo (700′); 33 miles north of Guaymas (500′); 15 miles north of Guaymas (100′); 5 miles south of Peon (sea level).

I have omitted from this list the extraordinary record for *pima* carried by Olsen (2) in his 1934 study of *Pogonomyrmex*. Among the Arizona stations Olsen gave "Mt. Lemmon, South Catalina Mts., 8000-9150 feet." Mt. Lemmon is the main peak in the Santa Catalina Mountains just north of Tucson and has a height of 9185 feet. The writer has collected there on several occasions and can state that there is scant likelihood that *pima* could occur above the 3000 foot level. That it could live above the 8000 foot level is out of the question. Above 8000 feet Mt. Lemmon supports a fairly heavy stand of conifers. At its higher levels Mt. Lemmon is certainly not the place where one would expect to find a strict xerophile such as *pima*. It is possible that the specimens on which Olsen's record was based were winged forms, carried by updrafts to the crest of Mt. Lemmon. But if they were workers it is evident that the specimens were incorrectly labelled as far as elevation is concerned. It also seems probable that the record from Bowie, attributed by Olsen to *pima*, is actually *imberbiculus*. As may be seen from the foregoing list, all other records for *pima* come from stations below 3000 feet and well to the west of the latitude of Bowie.

By comparing the locality lists for *imberbiculus* and *pima* it is easy to appreciate that the former species is decidedly more adaptable. The lateral range of *imber-*

biculus exceeds that of *pima* both east to west and north to south. The vertical range of *imberbiculus* is almost twice as great as that of *pima*, for although *imberbiculus* does not descend to sea level, as *pima* does, it is capable of reaching levels above 6000 feet, while *pima* rarely reaches the 3000 foot level. The more restricted range of *pima* makes it easy to place that species in the Sonoran Desert biotic association as defined by Shreve (5) but no such single association is possible in the case of *imberbiculus*. Most of the middle of the range of *imberbiculus* lies in what Shreve calls the Chihuahuan Desert, a biotic association found on the Mexican plateau and adjacent portions of west Texas, New Mexico and Arizona. But it is scarcely possible to consider the stations in central Texas and Oklahoma in this category and those in western Arizona, Sonora and California are clearly in the Sonoran Desert association. It thus appears that the distribution of *imberbiculus* spans at least three different biotic areas.

It is interesting to contrast the distribution of *imberbiculus* and *pima* with that of *Novomessor cockerelli* and *albisetosus*, since the latter two xerophiles occur in many of the stations where *Ephebomyrmex* is present. The writer has attempted to show (6) that the distribution of our two species of *Novomessor* is largely determined by their response to elevation. There can be no doubt that elevation is also a highly important factor in the case of *imberbiculus* and *pima*. The response of *imberbiculus* to elevation is very similar to that of *N. cockerelli* hence it is not surprising to find that the two species occur together over a very large area from western Texas to western Arizona and south along the Mexican plateau as far as Durango. With certain restrictions this range is true of *N. albisetosus* also. But *pima* behaves in an entirely different fashion. Its distribution is limited to Arizona and Sonora and in those states it occurs only in stations of low to moderate elevation. It is hard to escape the conclusion that this behavior is a result of the different elevational range possessed by *pima*. Since the upper limit of this range appears to be in the neighborhood of 3000 feet it follows that *pima* would, on this

basis alone, be unable to utilize stations on the Mexican plateau or similar areas to the north of it. I do not for one moment maintain that elevational range is the only factor that restricts *pima* to the Sonoran Desert region but it would surely seem to be one of the more important factors which go to determine this range.

I wish now to consider the habits of *imberbiculus* and *pima*. It is much to be regretted that Wheeler did not content himself with the excellent account of the habits of *imberbiculus* which he published in 1902 (7). All the nests on which Wheeler's original account was based were found under stones and each nest contained very few workers. Beneath the stones Wheeler discovered small chambers containing unhulled seeds and others full of brood. When transferred to artificial nests the *imberbiculus* workers made no effort to utilize the seeds as long as they were supplied with insect food. But when the supply of insect food was cut off the workers hulled the seeds and not only ate them but also fed pieces of them to the larvae. Wheeler was soon aware (8) that his original nests of *imberbiculus* had been exceptional in that they were built under stones, for he discovered other colonies at San Angelo, Texas, where the nests were free in the soil and surmounted by small craters. But it may be said that at the start Wheeler presented a very accurate picture of the nesting habits of *imberbiculus*. It is, therefore, difficult to explain why he obscured this picture in 1910 (9) by grouping *imberbiculus* and *pima* with other species of *Pogonomyrmex* with which they have little or nothing in common. In his celebrated volume *Ants* (page 283) Wheeler makes the following observation:

"1. *P. subdentatus, apache, sancti-hyacinthi* and *desertorum* and *Ephebomyrmex imberbiculus, townsendi* and *pima*. These are small species confined to the deserts of Texas, New Mexico, Arizona, Californa and northern Mexico. Their colonies are always insignificant and widely scattered, comprising only a few individuals. The nests are small, obscure craters, 10-20 cm. in diameter and a

few centimeters high. The workers make no attempt to cut down the surrounding vegetation which often grows on the crater immediately around the entrance."

It is hard to see what Wheeler had in mind here. Neither *subdentatus* nor *apache* (or its synonym *sancti-hyacinthi*) are small species. Indeed the major worker of *apache* is one of our largest species, being surpassed in this respect only by the major of *badius*. While the number of individuals in a nest of *apache* is small, there is ordinarily no crater nor disc around the nest entrance and this paucity of excavated material is, as Cole has recently shown (10), one of the characteristics of this species. The colonies of *subdentatus* ordinarily contain at least 500 individuals and this species usually constructs a ragged disc of gravel, not a crater, around the nest entrance. The nests of *desertorum,* while less populous than those of *subdentatus,* are far larger than those of *imberbiculus* and *pima,* and the coarse, flattened gravel mounds which *desertorum* customarily makes are wholly unlike the delicate craters constructed by our representatives of *Ephebomyrmex*. I mention these inconsistencies because it is certain that they have obscured Wheeler's original clear-cut presentation of the habits of *imberbiculus*.

As far as the writer has been able to determine the habits of *imberbiculus* and *pima* are so similar that a single account will cover both species. On rare occasions these ants will nest beneath stones but in most cases they build their nests without any covering object. The soil selected is always hard-packed and usually of a rather fine, sandy texture. There is a single, small nest entrance not more than 3 or 4 mm. in diameter, and the passages which lead from it are equally delicate. The storage chambers are small. Both the storage chambers and the passages collapse very easily if the nest is excavated and this makes it unusually difficult to trace them. The only practical method for doing so that the writer has found is to excavate the nest very gradually and allow time between excavations for the workers to reopen the caved-in passages. If three or four days can be devoted

to the process it is possible to follow the passages to their ends. There are usually not more than three or four of them and the length of any passage seldom exceeds five inches. The soil brought to the surface by the ants is usually very fine and the crater formed from it is easily dispersed by rain or wind, hence many nests are without a crater much of the time. Most of the craters measured by the writer were 2½ inches or less in diameter. There are seldom more than 75 workers in a nest. The average number seems to be about 50. The workers store both seeds and the remains of other insects, especially other ants. In view of the lack of pugnacity of our species of *Ephebomyrmex* it seems safe to assume that such stores of insect remains are secured by scavenging rather than by attacks on living victims. Seeds are stored unhulled and several sorts are accepted. One colony kept in an artificial nest preferred white clover seed to grass seed. The slow hulling of the seeds prevents the formation of a chaff pile for the hulls, which are discarded outside the nest entrance, are dispersed before they can accumulate into a chaff pile.

As Wheeler noted, it is unusually difficult to secure sexual forms. Since he observed a marriage flight of *imberbiculus* near Deming, New Mexico, on July 12th (13), and since the writer secured a colony of *imberbiculus* containing callow males and females in the Davis Mountains of Texas on May 25th, it might be expected that alates would ordinarily be present in the nests of this species during the month of June. Actually this is seldom the case and as *imberbiculus*, like many xerophilous ants in the southwest, apparently holds its marriage flight shortly after the onset of the summer rains in early July, the absence of alates in many nests during the month of June may mean that *imberbiculus* produces sexual brood only in especially favorable years. The pupal males and females show a surprising capacity for moving their appendages prior to transformation. The workers fail to remove all of the pupal exuviae from the alates when the latter transform, and the patches of pupal casing

which adhere to the newly emerged males and females give them the appearance of a person peeling after a bad case of sun burn. Wheeler calls these ants "timid" but perhaps it would be better to describe them as docile. They do not seem particularly frightened when they are disturbed and they make little effort to escape and none to sting. The writer has picked up hundreds of specimens and has yet to be stung by one of them. This seems rather curious, since these ants are provided with a powerful sting, despite their small size. The sting is fully two-thirds as long as that of the smaller workers of *barbatus*, a species which stings atrociously, and certainly the presumption would be that *imberbiculus* and *pima* could use their stings effectively if they chose to do so. These ants forage at least ten months a year and probably, in a mild winter, all year long. When foraging they move at a slow but steady gait. They usually forage singly.

There follows the description of the female of *imberbiculus*, which has not hitherto been described or figured: The features cited in this description are those which could not be shown in the figure:

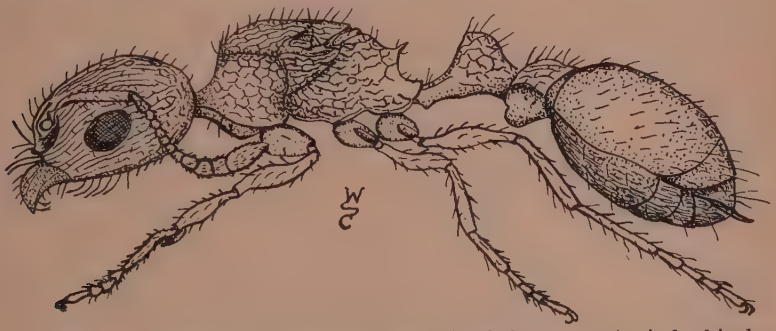

Fig. 1. Female of *Pogonomyrmex* (*Ephebomyrmex*) *imberbiculus* Wheeler.

Length of head (mandibles excluded) 1.2 mm.; length of thorax 1.75 mm.; overall length 4.5- 5 mm. The sides of the head behind the eyes slightly narrowing toward the occiput. Occipital border slightly concave in the middle. Middle of the clypeus scarcely projecting beyond the two prominent teeth which stand in front of the

antennal fossae. Mandibles armed with five prominent teeth which decrease in size from the apical tooth inward, and a single much smaller tooth at the angle between the masticatory margin and the inner margin. The antennal scape in repose reaches the level of the lateral ocellus. Base of the scape with a conspicuous flange. Frontal lobes rather narrow in front, only slightly divergent behind and not projecting much above the antennal fossae. Frontal area large and crossed by a single median ruga. Clypeus with five longitudinal rugae. Color, when alive, a deep, ferrugineous red which fades to an orange red as the specimen dries.

Gynetype: a female from Arsarca Canyon, Chinati Mountains, Texas, in the writer's collection. A second female from the Davis Mountains, Texas, agrees well with the type in the characters cited above.

It seems worth commenting here on Wheeler's original concept of the diagnostic features of the subgenus *Ephebomyrmex*. As his principal criterion for establishing the group Wheeler cited the absence of a beard or psammophore on the under surface of the head. In the figure of *imberbiculus* which accompanied the original description of the worker of that species, (7) Wheeler made no attempt to depict the pilosity, either on the gula or elsewhere. But in the description he noted the presence of a group of erect hairs on the gula which did not form a "conspicuous" beard. In this stand Wheeler seems to have been influenced by Forel, who had set up a subgenus to receive the beardless species *mayri* (11). But the gular hairs of *P. mayri* are uniformly short and even those at the anterior edge of the gula do not project much beyond it. They cannot by any stretch of imagination be said to form a psammophore. Unfortunately this is not the case with all the species of *Ephebomyrmex*. Oddly enough Wheeler's two species *imberbiculus* and *pima* are the worst offenders in this respect. Each has a small, median psammophore on the anterior half of the gula which runs diagonally inward toward the midline of the head. It may be admitted that these groups

of hairs are less regular in arrangement and much less conspicuous than the linearly-arranged lateral psammophores of some of the other species, but it certainly cannot be said that the gular pilosity of *imberbiculus* or *pima* is as scant as that of *mayri*. While our species of *Ephebomyrmex* do not have full beards, they certainly do have goatees, hence Wheeler's distinction is one of degree, not of kind. There can be little question that when Emery stated in 1921 (12) that the subgenus *Ephebomyrmex* is an artificial group, he had the above facts in mind. Emery pointed out that neither the absence of a psammophore nor the presence of a toothed epinotal flange at the insertion of the petiole distinguish the members of *Ephebomyrmex* from certain intermediate species ordinarily assigned to the subgenus *Pogonomyrmex*. Emery cited the South American species *silvestrii* and *brevibarbis* in this connection but he could have mentioned the North American species *huachucanus* with equal propriety. The psammophore in both worker and female of *huachucanus* is transitional both in degree of development and position. The hairs which form it are fairly long and, for the most part, linearly arranged, but this line of hairs runs diagonally inward from the insertion of the mandible to a point at the middle of the head which is a little in advance of the rear border of the gula. This gives a V-shaped median psammophore which is quite unlike that of most species in the subgenus *Pogonomyrmex*, where the hairs of the psammophore are arranged in a line along the outer edge of the gula and turn in toward the center of the head at its rear edge.

One can agree with Emery that the criteria which Wheeler used for the recognition of *Ephebomyrmex* are not well-chosen and one can further agree with him that substantial improvement in the situation will necessitate a better acquaintance with the sexual forms of this group. In this connection the writer would like to call attention to one interesting feature in the thoracic structure of the female of *imberbiculus*. The scutellum of the female of *imberbiculus* does not rise abruptly above the metano-

tum. Instead its rather thin rear edge forms, with the metanotum and the basal face of the epinotum, a single, sloping declivity which is broken only by the sutures at either side of the metanotum (see figure). In all species belonging to the subgenus *Pogonomyrmex* where the writer has been able to examine the female (*apache, badius, barbatus, californicus, huachucanus, occidentalis* and *subdentatus*), the scutellum rises well above the metanotum. This rise is usually abrupt and sometimes the rear face of the scutellum overhangs the metanotum. There is thus a break in the outline of the thorax at the metanotum and the dorsum of the scutellum is always at a level well above that of the metanotum or the anterior edge of the epinotum. As to whether these distinctions will hold uniformly through both subgenera remains to be seen, but if they do there should be less difficulty in defending the status of *Ephebomyrmex* as a valid subgenus.

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A NEW GENUS AND NEW SPECIES OF CHRYSOPIDAE FROM THE WESTERN UNITED STATES, WITH REMARKS ON THE WING VENATION OF THE FAMILY (NEUROPTERA)[1]

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In some material collected by the writer in southern Arizona in 1949, a single female specimen of a chrysopid was found, representing a previously unknown genus and species. The venation of this genus is remarkably like that of the Chrysopidae described from the Miocene shales of Colorado. Two other recent genera, *Triplochrysa* Kimmins and *Dictyochrysa* Petersen, similarly retain an archaic type of venation. Since these latter two genera have not been discussed in the light of the interpretation of the venation given by F. M. Carpenter (1935), they are compared in this paper with the new genus and with the Miocene genera.

Pimachrysa, new genus

Head: vertex moderately elevated; anterior tentorial pits large; labrum emarginate. Antennae slightly longer than fore wing, scape short, moderately swollen; flagellum filiform, the segments slightly longer than wide. Tarsal claws simple, without basal tooth. Fore wing: costal area rather narrow; subcostal cross-vein basad of origin of Rs; Rs arises basad of first intra-median cell. Intra-median cell subtriangular, with apex toward base of wing. Second medio-cubital cross-vein located proximally to furcation of MP. Two graduate series; Psm merges with inner series, strongly zig-zagged; Psc merges

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with outer series, not so strongly zig-zagged. Anals not forked, run in a smooth curve to margin of wing. Jugal lobe prominent, one jugal vein present. Hind wing: jugal process small, costal area narrow. MP fused with Rs for a short distance, basal Banksian cell unusually large. Two gradate series; Psm weakly differentiated from inner gradates, not so strongly zig-zagged as in fore wing. Psc merges with outer gradates as in fore wing.

Generotype: *Pimachrysa grata* n. sp.

This genus is similar in its venation to *Triplochrysa* Kimmins, from which it may be distinguished by its having the first intra-median cell closed apically by a cross-vein, and by the occurence of only two gradate series in both wings.

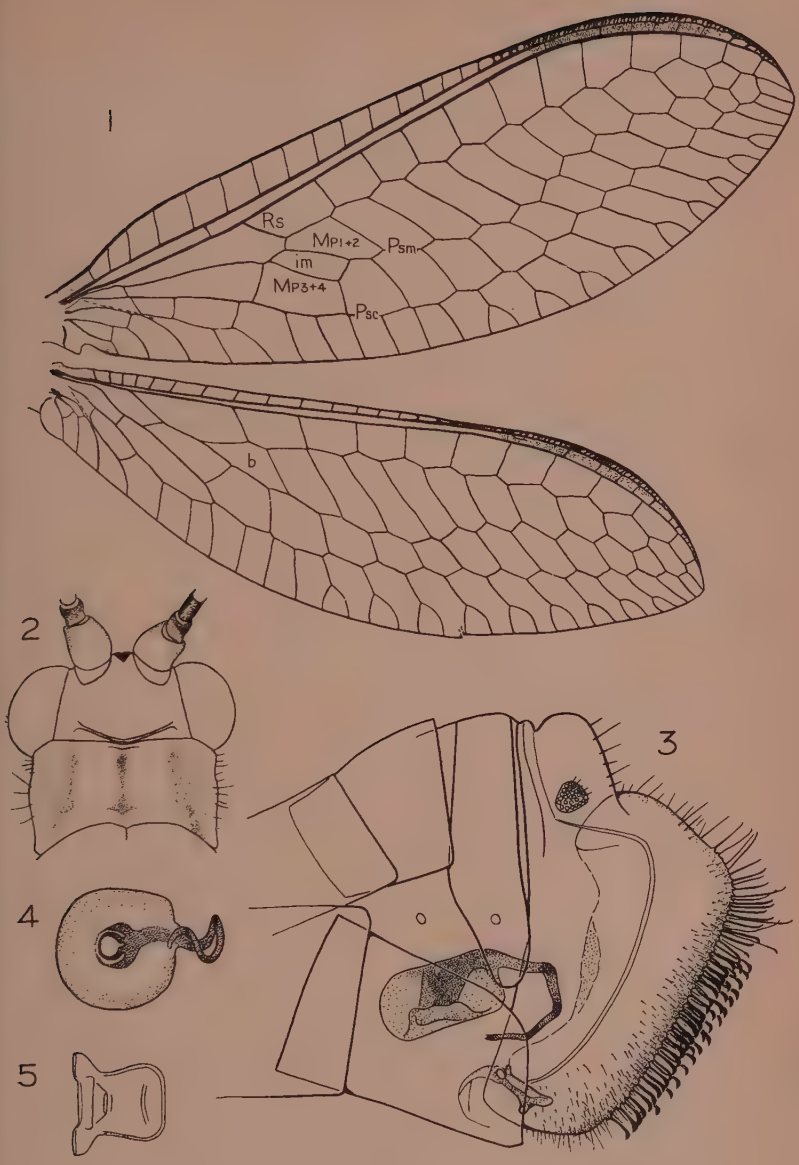
Pimachrysa grata n. sp.

Figs. 1-5

Head straw yellow, a shallow groove between bases of antennae black; maxillary and labial palpi pale at base, penultimate segment fuscous, last segment black. Antennae stout; scape pale, with medial, ventral, and lateral surfaces infuscated distally; condyle appears as dark longitudinal line on medial surface; pedicel short, black; flagellum black. Pronotum wide, anterior margin straight; whitish yellow with three fuscous stripes slightly convergent anteriorly. Meso- and metanota yellow, scuta infuscate posterolaterally. Cervical sclerites black; meso- and metapleurae bright yellow, with many areas fuscous. Legs ivory white; femora with a wide fuscous band before the knees. Tibiae slightly infuscated on lateral surface just beyond knee; tarsi a uniform light brown, last segment much darker than preceding. Legs uniformly clothed with short, dark, setae.

Explanation of Plate 2

Pimachrysa grata n. sp. Fig. 1. Wings; im, first intra-median cell; Psm, pseudomedia; Psc, pseudocubitus; b, basal Banksian cell. Fig. 2. Dorsum of head and pronotum. Fig. 3. Terminal abdominal segments of female (lateral view). Fig. 4. Spermatheca (ventral view). Fig. 5. Subgenital plate (ventral view).



ADAMS — PIMACHRYSA GRATA

Wings: membrane hyaline, veins slender, setae few, short. Fore wing: costa fuscous near base, otherwise pure white completely around wing. Costal veinlets dark-fuscous; Sc white, slightly fuscous basally; R pure white its whole length; stigma white, costal area of stigma densely clothed with short dark setae. All other veins in basal area of wing white as far out as the cubital fork, thence becoming uniformly dark-fuscous. Hind wing: colored about as in fore wing, but with a slightly more extensive area of white veins. Venation as in Figure 1.

Abdomen: short, slender, with terminal segments greatly enlarged. Pale yellow above, with narrow median fuscous stripe, most prominent on second tergite, where it forms an elongate diamond-shaped mark. Sternites brown-fuscous with large central area and posterior margins yellow. Genitalia as in Figures 3-5. Gonapophyses laterales bear on their posteroventral margins three rows of heavy bristles having the ends broadened and strongly reflexed.

Length of antennae, 16 mm.; fore wing, 14 mm.; hind wing, 12.5 mm.; expanse 28.7 mm.; length of body, 7.5 mm.

Holotype: Madera Canyon, Santa Rita Mts., Arizona, 26 August, 1949, at light. P. A. Adams, collector. In the Museum of Comparative Zoology.

Pimachrysa appears to represent one of a group of relict genera with extremely primitive venation. Carpenter (1935) has revised the fossil Chrysopidae of the Tertiary; the resemblance of these forms to *Pimachrysa*, and to *Triplochrysa* and *Dictyochrysa*, is striking. These three genera are, without doubt, the most primitive of known living chrysopids, at least as regards the wing venation.

A characteristic common to these three genera, differentiating them from both the Tertiary forms and other Recent forms, is the position of the second medio-cubital cross-vein, basad of the furcation of MP. With the exception of *Hypochrysa*, in all other genera known to the writer, if this furcation is present, the cross-vein connects MP 3 + 4 and CuA. Whether this basal position is a primitive or a specialized condition is debatable.

Paleochrysa, which is otherwise the most primitive described genus, has the quadrangular first intra-median cell characteristic of more advanced genera such as *Nothochrysa.* On the other hand, the occurence of an intra-median cell formed as in *Pimachrysa, Triplochrysa,* and *Dictyochrysa,* in such widely separated areas as North America and Australia, would seem to indicate that the basal position of the second medio-cubital cross-vein was broadly distributed in the past. It is entirely possible that the basal position has been secondarily derived; however, the simple bifurcate condition of MP found in these genera certainly appears to represent the more primitive situation. *Paleochrysa, Nothochrysa, et al.,* may then be representative of steps that have occurred in the evolution of more advanced genera, which possess a triangular cell, derived from the quadrangular first intra-median cell by fusion of MP 1 + 2 and MP 3 + 4. The apex of this type of triangle is directed apicad, not basad as is that of *Pimachrysa.* In *Hypochrysa,* since MP 3 + 4 fuses with MP 1 + 2 as in *Chrysopa,* the basal position of the cross-vein is presumably secondarily derived.

The first medio-cubital cross-vein of the fore wing is a remnant of a prominent medio-cubital y-vein, and is present in all recent Planipennia. Its absence from several of Carpenter's drawings of the Miocene genera seemed significant when viewed in the light of Kimmins' speculation (1952b) that, in the Apochrysinae, the cross-vein found replacing it in its usual position represents instead the remnant of MP 3 + 4. An examination of the fossils used in the preparation of these drawings demonstrated, however, that this cross-vein is present in all three of the Miocene genera, and is located in its usual place, opposite the cubital fork.

The subcostal cross-vein has been omitted in Carpenter's drawings, with the exception of Figure 2 (*Paleochrysa fracta*), in which it should be located slightly distad of the first radial cross-vein, instead of where shown. In *Paleochrysa,* this cross-vein is always located approximately opposite the first radial cross-vein; in *Tribochrysa*

and *Lithochrysa*, it is much closer to, but still distal to, the origin of Rs. In *Dictyochrysa*, it is barely proximal to Rs, while in more advanced forms it progresses toward the wing base. The position of this cross-vein in the genera herein treated correlates well with the degree to which archaic venational features are represented. Unfortunately, Martynov's illustration of the Jurassic *Mesypochrysa* does not include this vein; it would be interesting to see if it then occurred still farther out on the wing than in *Paleochrysa*.

The distad progression of the origin of Rs in the fore wing has been discussed by Carpenter. In all three of the recent relict genera, as would be expected, Rs originates basad of the fork of MP.

Members of the Jurassic family Mesochrysopidae demonstrate various degrees of development of the Pseudomedia and the Pseudocubitus. *Mesypochrysa* has a well-developed double gradate series, but both branches of MP run straight toward the wing margin; there is consequently no trace of a Psm or a Psc. *Mesochrysa*, because of its apically fused Sc and R, which results in a rather myrmeleontiod appearance of the wing apex, is to be considered as a specialized side-branch of the chrysopid stem. In this genus, however, both branches of MP show a tendency to turn posteriad, and a weakly developed Psm and Psc are present. The Miocene genera all have developed the strong elbow in the branches of MP characteristic of modern genera; *Triplochrysa* and *Dictyochrysa* represent a more primitive condition in this respect, the branches of MP running posteriad in an even curve. Psm and Psc are well developed in the Miocene forms, but retain the archaic zig-zagged condition; Psm in both wings runs into the inner gradate series. In *Triplochrysa*, the course of Psm has shifted somewhat toward the margin of the wing, and a third, inner, series of gradates occurs. Psc remains in a relatively unspecialized condition, merging with the outer gradates, and showing fairly strong zig-zagging. Psm in more specialized genera has a strong tendency to straighten, so that zig-zagging disappears;

in genera such as *Nothochrysa,* this "vein" merges with the outer gradate series, turning up slightly near its end. As the straightening tendency reaches its culmination, e.g. in *Chrysopa,* Psm runs straight to the margin of the wing, and turns slightly downward near its end. Psc in genera such as *Chrysopa* may become straightened out basally, and is interrupted by Psm apically.

The writer feels it most unlikely that, as suggested by Kimmins, *Dictyochrysa* could possibly have been ancestral to *Triplochrysa.* Admittedly, its venation reflects a most archaic condition. However, in the Planipennia, certain groups frequently become specialized by the multiplication of the number of cross-veins or branches of the longitudinal veins. Examples of this which come readily to mind are the Psychopsidae, *Drepanopteryx* (Hemerobiidae), and the Palparinae (Myrmeleontidae). These forms frequently retain a most archaic arrangement of veins, and hence furnish quite useful evidence for venational studies. The retention of these primitive characters, however, is not an indication that these forms are unspecialized and therefore eligible to be considered as ancestral to other groups. It is a result of a high degree of specialization by emphasis upon an amplification of the original system of venation, rather than specialization by reduction, or by modification of original pathways of veins by fusion. *Dictyochrysa* appears to constitute a case of this kind. There is no evidence that the network of hexagonal cells in the apical part of the wings is a primitive character; on the contrary, all the fossil forms have a relatively simple venation, with a normal number of cross-veins, and with oblong cells like those of modern representatives of the family. There is therefore no reason to assume that the simple venation of the fossil forms has become complex, as seen in *Dictyochrysa,* with subsequent reduction to the condition of simplicity seen in *Triplochrysa.*

It is the writer's opinion that consideration of the venational trends discussed above — the progression basad of the subcostal cross-vein, the apicad migration of Rs, the formation of the first intra-median cell, and the relationship of the gradates with Psm and Psc — can furnish

much useful information concerning the phylogeny of the Chrysopidae. The archaic expression of these characters in the Recent genera *Dictyochrysa, Triplochrysa,* and *Pimachrysa* indicates that they constitute an extremely primitive, although not necessarily closely related, assemblage, similar in many respects to the Miocene genera.

The writer gratefully acknowledges the kindness of Prof. F. M. Carpenter in making possible the examination of fossil Chrysopidae from the collection of the Museum of Comparative Zoology.

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THE RELATIONSHIP OF TWO AFRICAN *Tetramorium* SPECIES (HYMENOPTERA: FORMICIDAE).—During 1955, Mr. Thomas Gregg, a student at Harvard University, made for me a small but select collection of ants in the vicinity of Epulu, Ituri Forest, in the Belgian Congo. The ants have been deposited in the Museum of Comparative Zoology at Harvard. Among the series were two nest samples of *Tetramorium*, of which the workers were a striking yellow in color, but with the alitrunk and petiole a contrasting blackish or piceous hue.

It was found that both series agreed in general with the description of *T. coloreum* Mayr (1901, Ent. Tidskr., 21: 273, worker; type loc.: Mungo R., Kamerun), while one of them corresponded more particularly to that of *T. coloreum* var. *postpetiolata* Santschi (1919, Rev. Zool. Afr., 7: 88, worker; type loc.: Penghe, Belgian Congo). The two series, while very similar at first glance, are distinguished by a number of characters. As noted by Santschi, *postpetiolata* has the postpetiole markedly broader than long and with a smooth and shining surface (in *coloreum*, not or just barely broader than long and with irregular longitudinal costulae or striae on the disc, extending onto the base of the gaster). Santschi also mentioned that the posterodorsal petiolar face is more rugose (and opaque) in *postpetiolata*. In addition, in my *postpetiolata* specimens, the petiolar node is distinctly thicker from front to rear, the alitrunk is narrower, lower and less suddenly constricted behind, and the propodeal and triangular metapleural teeth are both distinctly shorter than in *coloreum*. Also, in *postpetiolata*, the erect hairs are slightly longer, more abundant (particularly on petiole), more slender and have more tapered apices.

Since Santschi's chief distinctions appear to be maintained, and even supplemented, in the present sympatric samples, I am suggesting that *Tetramorium postpetiolatum* be granted **new status** as a species.

Mr. Gregg took the *T. coloreum* nest at Epulu from the upper side of a log covered with earth in the rain forest. The *T. postpetiolatum* series was taken in this vicinity, also in rain forest, in the soil beneath leaf litter. W. L. BROWN, JR., Museum of Comparative Zoology.

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